

### **REMARKS**

Claims 1 – 34 are pending in the Application. Claims 1 – 34 have been rejected. Claims 1, 5, 9, 23, and 31 have now been amended. New Claim 35 has now been added.

### **Drawings**

The Examiner is thanked for approving the drawings filed on March 22, 2005.

### **Claim Rejections – 35 USC 112**

The Examiner rejected claims 1-22 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

The Examiner rejected claim 1 as lacking a sufficient antecedent basis for the limitation "said imaging device". Claim 1 is now amended so as to recite the sufficiently antecedent based limitation "said sensing device" rather than the rejected limitation.

The Examiner rejected claim 5 as dependent on itself. Claim 5 is now amended so as to depend on claim 4.

The Examiner rejected claim 9 as lacking a sufficient antecedent basis for the limitation "said imaging device". Claim 9 is now amended so as to recite the sufficiently antecedent based limitation "said sensing device" rather than the rejected limitation.

Claims 2-4, 6-8, and 10-22 were rejected as dependent on a deficient claim. It is respectfully maintained that in light of the above described amendments, claims 2-4, 6-8, and 10-22 are allowable.

### **Claim Rejections – 35 USC 102**

The Examiner rejected claims 1-3, 8-18, 22-25, 27, and 29-34 under 35 USC 102(b) as being anticipated by Hopper (GB Patent Application No. 2,258,321 A).

Favorable reconsideration of this rejection in view of the above amendments and the following explanations is respectfully requested.

The present invention discloses a system and method for inspecting limited access spaces, and more particularly but not exclusively, to a vehicle inspection system suitable for inspection of parts of vehicles that are awkward to inspect easily according

to real time or *preprogrammed instructions* for moving a sensing device *linearly along a track*, for rotating the sensing device *about an axis perpendicular to the track*, and for rotating the sensing device *about an axis parallel to the track*.

That is to say that with the present invention, a pre-recorded program may be specifically tailored for maneuvering the sensing device about the specific type of limited access space, as described on page 3, line 16: "Preferably, said scanning control unit is controllable by at least one of direct user input and by preprogramming, to scan said imaging device about said limited access space."

For example, it is possible to have a pre-recorded program specifically tailored for maneuvering the sensing device about the underside of a Toyota Corolla vehicle, to check say the space behind the back axle towards the wheel. Such a prerecorded program would not be suitable for maneuvering the sensing device about the interior spaces around the underside of a GMC Safari van. That is to say that the movements of the sensing device are preprogrammed specifically enough to maneuver around features specific to given vehicles or vehicle types. *The prerecorded program includes instructions for linear movement of the sensing device along a track, rotational movement of the sensing device about an axis perpendicular to the track, and rotational movement of the sensing device about an axis parallel to the track.* The program is tailored specifically for the given vehicle or vehicle type.

**Claim 1**, as currently amended, defines a limited access space inspection system comprising: a sensing device for sensing over a region in the limited access space, a mounting for mounting the sensing device to be scannable about the limited access space and a scanning control unit, associated with the sensing device, for controlling the sensing device to scan about the limited access space *according to a pre-recorded program*, the program comprising instructions for *moving the sensing device linearly along a track*, for rotating the sensing device *about an axis perpendicular to the track*, and for rotating the sensing device *about an axis parallel to the track*.

As described hereinabove, and defined by claim 1, the present invention describes a limited access space inspection system having a scanning control unit, associated with the sensing device, for controlling a sensing device to scan about the limited access space *according to a pre-recorded program*, the program comprising instructions for *moving the sensing device linearly along a track*, for rotating the sensing device *about*

*an axis perpendicular to the track, and for rotating the sensing device about an axis parallel to the track.*

That is to say that with the present invention, a pre-recorded program may be specifically tailored for maneuvering the sensing device about the specific type of limited access space, as described on page 3, line 16: "Preferably, said scanning control unit is controllable by at least one of direct user input and by preprogramming, to scan said imaging device about said limited access space."

The application further describes on page 6, line 23: "The imaging device 12 is linearly movable along the track 14 in the direction of arrow 18 and is preferably also able to rotate about the track and about an axis perpendicular to the track, the latter at 360°, with the help of controllable actuators".

The inspection device disclosed by Hopper is *not movable and not programmable*. Hopper describes in page 2, in the second paragraph, in line 9: "there is provided an inspection system for inspecting the underside of a vehicle, the system comprising a reflector *positioned* to receive and redirect images of an object to lens of a line scan camera positioned within a relatively compact housing, the light receiver being *located* below a window set in an upper wall of the housing at a position removed from the camera".

Hopper never discloses or even hints at the idea of a limited access space inspection system having a scanning control unit, associated with the sensing device, for controlling a sensing device to scan about the limited access space *according to a pre-recorded program*, the program comprising instructions for *moving the sensing device linearly along a track*, for rotating the sensing device *about an axis perpendicular to the track*, and for rotating the sensing device *about an axis parallel to the track*, as taught by the present invention and defined by claim 1.

It is thus believed that claim 1 is both novel and inventive over the prior art and respectfully maintained that the claim should be allowed.

### **Claim Rejections – 35 USC 103**

The Examiner further rejected claims 19, 20, 21, and 28 under 35 USC 103(a) as unpatentable over Hopper, and claims 4-7 and 26 as unpatentable over Hopper, as applied to claims 1 and 23, in further view of Carangelo et al (US Patent No. 5, 841, 546) and Zigler (US Patent No. 3, 397, 103).

Favorable reconsideration of this rejection in view of the above amendments and the following explanations is respectfully requested.

Hopper GB Patent Application No. 2,258,321-A discloses an inspection system and method which provide a representative picture of the underside of a vehicle. However, the inspection device disclosed by Hopper is *not movable and not programmable*. Hopper describes in page 2, in the second paragraph, in line 9: "there is provided an inspection system for inspecting the underside of a vehicle, the system comprising a reflector positioned to receive and redirect images of an object to lens of a line scan camera positioned within a relatively compact housing, the light receiver being located below a window set in an upper wall of the housing at a position removed from the camera". Hopper further describes in page 5, second paragraph, in line 8: "In another aspect, the invention provides apparatus for inspecting the underside of a vehicle, the apparatus comprising a housing including a line scan camera mounted with its lens facing towards a prism or inclined mirror positioned to direct light images from a vehicle positioned above the housing to the camera lens, the height of the housing being reduced to a minimum consistent with the span necessary to house the camera and the lens or mirror".

Furthermore, the system and methods taught by Hopper utilize an array comprising a reflecting device or mirror which receives the images of the underside of the vehicle and redirects them to the *fixed positioned* line scan camera, as described above.

Consequently, it is practically impossible to zoom-in and closely inspect a suspicious pattern, for example, dangerous small cracks which emerge in a mechanical part, in the limited access space. Thus the hopper system and method have much limited implementations, in comparison with the present invention.

Carangelo et al (US Patent No. 5, 841, 546), as described in the field of invention section, relates to spectroscopic technology, and more particularly to technology for analyzing materials and material surfaces using reflectance absorption spectroscopy.

Carangelo describes a non-contact spectroscopy system, which includes a scanning head structure with transmitting optics for focusing radiation onto the surface of material to be analyzed, and receiving optics for collecting radiation reflected from the surface of the material and directing the reflected radiation onto optic fiber structure for transmission to a spectroscopic analyzer structure.

Zigler (US Patent No. 3, 397, 103), as described in the field of invention section, relates to detection of minute amounts of trace elements in a field environment, using laser induced spectroscopy. In particular, Zigler relates to a mobile apparatus which allows in situ measurement and data collection of ground water trace element pollutants.

**Claim 23**, as currently amended, defines a vehicle underside inspection system comprising: a floor mounted track, a sensing device mounted on the floor track to be linearly movable along the floor track, a scanning control unit, associated with the sensing device, configured to control the sensing device to sense about the vehicle underside *according to a pre-recorded program*, the program comprising instructions for *moving the sensing device linearly along a track*, for rotating the sensing device *about an axis perpendicular to the track*, and for rotating the sensing device *about an axis parallel to the track*, and an output, associated with the sensing device, for providing a display signal of output of the sensing device.

As described hereinabove, and defined by claim 23, the present invention describes a vehicle underside inspection system having a scanning control unit, associated with a sensing device, for controlling the sensing device to scan about the vehicle underside *according to a pre-recorded program*, the program comprising instructions for *moving the sensing device linearly along a track*, for rotating the sensing device *about an axis perpendicular to the track*, and for rotating the sensing device *about an axis parallel to the track*.

As described hereinabove, neither Hopper nor Carangelo nor Zigler discloses or even hints at the idea of a vehicle underside inspection system having a scanning control unit, associated with a sensing device, for controlling the sensing device to scan about the vehicle underside *according to a pre-recorded program*, the program comprising instructions for *moving the sensing device linearly along a track*, for rotating the sensing device *about an axis perpendicular to the track*, and for rotating the sensing device *about an axis parallel to the track*, as taught by the present invention and defined by claim 23.

It is thus believed that claim 23 is both novel and inventive over the prior art and respectfully maintained that the claim should be allowed.

**Claim 31**, as currently amended, defines a method of scanning a limited access space, the method comprising: interpolating a linear track into the space, the linear track having a sensing device movably mounted thereon, recording a scanning program, and *controlling the sensing device to move according to the recorded scanning program*, thereby to scan the space, wherein the recorded scanning program comprises *instructions for moving the sensing device linearly along the track*, instructions for rotating the sensing device *about an axis perpendicular to the track*, and instructions for rotating the sensing device *about an axis parallel to the track*.

As described hereinabove, and defined by claim 31, the present invention describes a method, which includes *controlling a sensing device to move according to a recorded scanning program*, the program comprising instructions for *moving the sensing device linearly along a track*, for rotating the sensing device *about an axis perpendicular to the track*, and for rotating the sensing device *about an axis parallel to the track*.

As described hereinabove, neither Hopper nor Carangelo nor Zigler discloses or even hints at the idea of a method which includes *controlling a sensing device to move according to a recorded scanning program*, the program comprising instructions for *moving the sensing device linearly along a track*, for rotating the sensing device *about an axis perpendicular to the track*, and for rotating the sensing device *about an axis parallel to the track*, as taught by the present invention and defined by claim 31.

It is thus believed that claim 31 is both novel and inventive over the prior art and respectfully maintained that the claim should be allowed.

The remaining claims mentioned in the Office Action are believed to be allowable as being dependent on an allowable main claim. No new matter is added by the present amendments.

### **Double Patenting**

The Examiner noted non-obvious type double patenting of the present invention with claims of US Patent Application No. 10/252,040.

A Terminal Disclaimer letter, accompanied by the fee set forth in USC 37 CFR 1.20 is sent attached to the Office Action Response.

All of the matters raised by the Examiner have been dealt with and are believed to have been overcome. In view of the foregoing, it is respectfully submitted that all the claims now pending in the application are allowable over the cited reference. An early Notice of Allowance is therefore respectfully requested.

Respectfully submitted,

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**Encl.:**

Petition for Extension of Time (1 Month)  
Additional Claim Fee  
Terminal Disclaimer